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THESIS

AN ANALYSIS OF THE EFFECTS OF ACCESSION SOURCE AS A PREDICTOR OF SUCCESS OF NAVY NURSE CORPS OFFICERS

by

Paula M. Jonak
Rosemarie J. Paradis

March 1998

Thesis Advisor: William R. Gates

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REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE March 1998.	3. REPORT TYPE AND DATES COVERED Master's Thesis

4. TITLE AND SUBTITLE AN ANALYSIS OF THE EFFECTS OF ACCESSION SOURCE AS A PREDICTOR OF SUCCESS OF NAVY NURSE CORPS OFFICERS

5. FUNDING NUMBERS

6. AUTHOR(S) Paula M. Jonak and Rosemarie J. Paradis

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Naval Postgraduate School
Monterey CA 93943-5000

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the authors and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT *(maximum 200 words)*

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14. SUBJECT TERMS Manpower Supply, Retention, Recruiting	15. NUMBER OF PAGES 86
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)

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AN ANALYSIS OF THE EFFECTS OF ACCESSION SOURCE AS A PREDICTOR OF SUCCESS OF NAVY NURSE CORPS OFFICERS

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from the

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March 1998

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ABSTRACT

This study explores various avenues for entering the Navy Nurse Corps and analyzes whether accession source is a predictor of military career behavior. Military career behavior is defined as completing initial obligated service, retention beyond initial obligated service, and promotion to lieutenant commander. Specific accession pipelines examined are the Naval Reserve Officer Training Corps (NROTC), Nurse Commissioning Program (NCP), Medical Enlisted Commissioning Program (MECP), direct procurement, and now defunct sources to include the Health Services Commissioning Program (HSCP), Baccalaureate Degree Completion Program (BDCP), and Full-time Out-service Training (FTOST). Cohort files were developed at the Naval Postgraduate School (NPS) from the Navy Officer Master Files, historical Master Loss and Reserve Files maintained at the Defense Manpower Data Center (DMDC), and the Naval Medical Information Management Center's (NMIMC) Bureau of Medical Information System (BUMIS) database. A multivariate logit regression was used to examine the relationship between accession source and success measures. The empirical analysis indicates that accession source could be used to predict retention after developing a better fitting model. Further research should be conducted on more recent accession cohorts, using a more inclusive model, to assist the Navy Nurse Corps in the development and use of future accession programs.

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ACKNOWLEDGEMENTS

We wish to extend our sincerest appreciation to the many individuals who contributed to this thesis. In particular, the assistance of Helen Davis and Judy Willis of the Naval Postgraduate School, in forming the data set and molding the data into a usable form, they contributed immensely to making this project possible. Without the guidance of Captain Patricia Kenney, Captain Penny Turner, and Commander Peggy Simpson this research would not have been spawned or carried through to fruition. The efforts of Dr. William Gates and Julie Dougherty of the Naval Postgraduate School should not go unnoticed. Their professionalism, wisdom, and superb editing abilities greatly improved the quality of this work. We would also like to thank the individuals who provided useful comments and suggestions for the methodology utilized and for discussing associated problems, especially Kathryn Kocher of the Naval Postgraduate School. Not to be excluded from this list is Dee Henry of the thesis processors office. Last but certainly not least, we would like to thank our families and friends for their support and understanding during travel time and long hours.

I. INTRODUCTION

A. BACKGROUND

During the last decade, the entire military has "rightsized" itself in response to defense budgetary cuts. As such, Navy Medical Department Corps endstrengths, which depend on the size of the active duty force, have decreased. In response to force size changes, Navy Nurse Corps (NC) accession sources have undergone various changes, including a significant realignment in fiscal year 1990 (FY90). This shift in accession programs changed the recruiting focus from direct procurement to school oriented programs.

Direct procurement has become a "valve" to supplement the new training pipelines when necessary to meet accession requirements. These new pipelines may produce a larger pool of career-minded officers, but possibly at greater expense to the military establishment. This study assesses various avenues for entering the Navy Nurse Corps and analyzes whether accession source is a predictor of "success." For our purposes, "success" and the phrase military careerist behavior, are used interchangeably. Success is defined as completing initial obligated service, retention beyond initial obligated service, and promotion to lieutenant commander (LCDR).

Historically, the ability to recruit military nurses depends on the cyclical nature of the civilian nursing market. The continually changing civilian nursing pool affects the Navy Nurse Corps' ability to meet endstrength goals. This is one reason for adjusting the nurse accession policy towards the training pipeline. FY96 was the first year that a group from the new sources reached a retention decision point; most were four-year obligors. The aggregate cohort behavior is analyzed by this research and compared to the behavior of two earlier cohorts.

In light of continued Department of Defense downsizing and the Navy Medical Department's reorganization, Nurse Corps senior executives have questioned whether changing the accession policy towards entry-level nurses has been advantageous. This study seeks to answer the accession policy question, and also, to aid future community managers in shaping the officer career force utilizing accession source as a critical planning factor.

B. OBJECTIVES

Accession sources should minimize costs while ensuring that the best-qualified professional nurses are commissioned into the Navy Nurse Corps. Results from this study benefit planning of future recruiting efforts and provide the necessary information to implement a successful Nurse Corps

officer accession policy. It also provides a methodology for other military medical communities seeking to manage their accession sources.

This study examines the current Navy Nurse Corps accession policy. The effects of changes in accession sources over the past two decades are analyzed by measuring success in three different entry cohorts, FY83, FY87 and FY90.

Secondary research topics include external market conditions that affected the military nursing recruit pool; current accession policies for the U.S. Army and U.S. Air Force; the benefits of each of the current Navy Nurse accession sources; whether accession source is a predictor of careerist behavior; and finally, recommendations for the Navy Nurse Corps accession policy.

C. SCOPE, LIMITATIONS, AND ASSUMPTIONS

This study explores various avenues for entering the Navy Nurse Corps and analyzes whether accession source is a predictor of military career behavior. Specific accession pipelines examined are the Reserve Officer Training Corps (ROTC), Nurse Commissioning Program (NCP), Medical Enlisted Commissioning Program (MECP), direct procurement, and phased out sources including Health Services Commissioning Program

(HSCP), Baccalaureate Degree Completion Program (BDCP), and Full-time Out-service Training (FTOST).

A potential limitation of this study is the measure used to gauge officer success. Success assumes that completing obligated service, staying beyond initial obligated service, and promoting to lieutenant commander indicates someone who will remain on active duty for a minimum of twenty years and continue to promote, if necessary, to complete that twenty year career. This measure does not consider individuals that may complete their career before reaching lieutenant commander, as with many MECP graduates. Individuals with broken service or an interservice transfer history are also not adequately addressed by this measure. Therefore, these two sources of entry will not be analyzed. This does not impact the results of the study because the numbers of individuals assessed through recall to active duty or interservice transfer are too small to be statistically significant.

Another limitation of this study is that job specific performance measures are not considered. Individuals are assumed to be high quality if they have been promoted to lieutenant commander.

D. ORGANIZATION OF THE STUDY

Chapter II briefly defines the accession programs and their individual nuances. It also reviews the pertinent literature associated with the civilian nursing market, various measures of success, and studies conducted on retention, attrition, and promotion behaviors. Chapter III describes the formulation and content of the three cohort officer data sets and explains the research methodology. Chapter IV presents the statistical analysis results. Chapter V summarizes the conclusions derived from the bivariate and multivariate analyses. It also reviews the policy implications, presents recommendations to improve selection procedures for high-quality individuals, and suggests areas for further research.

II. LITERATURE REVIEW

A. ACCESSION PROGRAMS

Entry into the NC community is currently accomplished through several possible routes, including: the Reserve Officer Training Corps, Nurse Candidate Program, Medical Enlisted Commissioning Program, and direct procurement. As a reminder, recall to active duty and interservice transfers will not be discussed for reasons stated earlier in this thesis. The following sections describe past and present Navy Nurse Corps Program Authorizations and their particular elements.

1. Naval Reserve Officer Training Corps (NROTC)

A main source of entry for line communities, NROTC is a new procurement source for the NC as of FY90. Entrants into the active duty force were first seen in FY92. This program is managed by the Commander, Navy Education and Training (CNET) and the Naval School of Health Sciences (NSHS), with the quota set by the NC community manager, and recruiting provided by the Commander, Navy Recruiting Command (CNRC). Individuals are selected by the NC Professional Review Board after they have met all qualifications, as noted by CNRC.

Applicants must be commissioned before their 26th birthday, unless a prior active duty waiver has been granted

for commissioning before age 29. An overall 3.0 GPA must be maintained by full-time students in a baccalaureate or master's degree-granting program.

Students are midshipmen while attending school, for a period which cannot exceed 4 years or 40 academic months. They receive money for tuition, books, fees, uniforms, and subsistence of $100 per month. During required 45-day active duty training periods in the summer, students receive O-1 pay and allowances. Commissioning takes place at the time of graduation, however active duty may be delayed up to 12 months by either the Navy or the individual. The active-duty obligation is between three and four years (36-48 months), depending on the amount of education completed while in the program. Upon completion of active duty, officers commissioned in this program must remain in the reserves until completion of an eight year military service obligation.(Program Authorization 130A)

2. Nurse Commissioning Program (NCP)

NCP entrants were first seen on active duty in the NC in FY93. This accession source is a financial assistance program for students enrolled in baccalaureate nursing education, and is the most recent version of the stipend programs. Originally authorized in the early nineties and revised in 1996, its predecessors are the Baccalaureate

Degree Completion Program and Health Services Commissioning Program. This program is managed by the Naval School of Health Sciences (NSHS), with the quota set by the NC community manager, and recruiting provided by the Commander, Navy Recruiting Command (CNRC). Similar to the NROTC program, individuals are selected by the NC Professional Review Board after they have met all qualifications, as noted by CNRC.

Applicants must be commissioned before their 35th birthday, maintain a 3.0 GPA, and complete baccalaureate degree requirements within 24 months.

Students are considered inactive reserve while attending school. They receive no money for tuition, books, fees, or uniforms. However, candidates receive a $5000 accession bonus and a subsistence of $500 per month, not to exceed 24 payments. The active duty obligation is between four and five years (48-60 months), depending on the amount of education completed while in the program. This program also requires an eight year total military service obligation.(Program Authorization 116C)

3. Medical Enlisted Commissioning Program (MECP)

This program is designed for personnel in all Navy enlisted ratings. It is an upward mobility platform allowing outstanding performers to complete education

requirements for a baccalaureate degree in nursing and earn a NC Officer commission. This program is managed by the NSHS with the quota set by the NC community manager. Eligible applicants are selected through a screening process by the NC Professional Review Board.

Applicants must be at least 18 years of age and be able to complete 20 years of active commissioned service by age 55. Additional requirements include completion of at least three years active service, a recommendation by their Commanding Officer, enrollment or acceptance into a baccalaureate program in a nursing degree-granting institution, a 2.5 college GPA, and the ability to complete education requirements within 36 months.

Selectees maintain their enlisted status, are eligible for continued advancement, and receive full pay and allowances while attending school. They receive no money for tuition, books, or fees; however, they may use their veteran's educational benefits. A six year reenlistment contract is signed at the time of enrollment and is superseded upon commissioning. The active duty obligation is four years (48 months) with a total military service obligation of eight years.(Program Authorization 116A)

4. Direct Accession of Registered Nurses

Once the only source of entry for the Nurse Corps, direct accession is now used only as a supplement to the new training pipelines when necessary to meet accession requirements. This avenue to enter the Navy Nurse Corps is managed by the Commander, Navy Recruiting Command (CNRC) with the quota set by the NC community manager. CNRC reviews the applications for technical and legal qualifications, then forwards them to the Bureau of Medicine and Surgery (BUMED) for screening of professional qualifications and general desirability by the NC Professional Review Board.

Applicants must be at least 20 years of age but have not yet reached their 35th birthday. Qualified individuals must have graduated from an accredited baccalaureate or masters degree-granting nursing education program and be licensed as a registered professional nurse. In the past, graduates of accredited three year diploma-granting nursing education programs with appropriate licensure were also accepted. Additionally, a graduate from an accredited associate degree-granting nursing education program that had a related field baccalaureate degree and a license as a registered professional nurse could apply for a commission. The active duty obligation for direct accessions is three

years (36 months), with a total military service obligation of eight years. Beginning in the late eighties, an optional accession bonus was offered to direct procurements. Accepting this bonus increased the active duty obligation to four years (48 months), with no additional total military obligation.(Program Authorization 116)

5. Phased Out Commissioning Sources

a. Health Services Commissioning Program (HSCP)

The last HSCP entrants into the active duty NC entered service in FY95. This program provided financial incentives for students completing degree requirements and obtaining reserve commissions in the dental, nurse, and medical service corps. HSCP preceded the NCP, and overlapped with the BDCP. This program was managed by the Commander, Navy Recruiting Command (CNRC), and individuals were screened by the NC Professional Review Board after they had met all qualifications.

Applicants had to be commissioned before their 35th birthday, maintain a 3.0 GPA, and complete baccalaureate degree requirements within 24 months.

Selectees for enlistment received no money for tuition, books, or fees. However, they were considered active duty E-3's and received full pay and allowances.

They were eligible for E-4 by making the dean's list, and E-5 by making a referral that resulted in an accession. If an individual was dis-enrolled, for any reason other than physical, they were required to complete recruit training and serve the remainder of their enlistment contract. After completing schooling, the active duty obligation was four years (48 months) with a total military service obligation of eight years.(Program Authorization 132)

b. Baccalaureate Degree Completion Program (BDCP)

The BDCP provided financial incentives to assist students enrolled in a baccalaureate degree nursing program. BDCP preceded the NCP and overlapped with the HSCP. This program was managed by the Commander, Navy Recruiting Command (CNRC), and individuals were screened by the NC Professional Review Board after meeting all qualifications.

Applicants had to be commissioned before their 35th birthday, maintain a 3.0 GPA, and complete baccalaureate degree requirements within 24 months.

Selectees for enlistment received no money for tuition, books, or fees. However, they were considered active duty E-3's and received full pay and allowances. They were eligible for E-4 by making the dean's list, and E-5 by making a referral that resulted in an accession. If an individual was dis-enrolled, for any reason other than

physical, they were required to complete recruit training and serve the remainder of their enlistment contract. Upon completing schooling, the active duty obligation was four years (48 months) with a total military service obligation of eight years.(Program Authorization 116B)

c. Full-time Out-service Training (FTOST)

This program was instituted to fill critical sub-specialty gaps during the late eighties. It is no longer an active gain source. Eligibility requirements included a Bachelor of Science in Nursing degree with a GPA above 3.0, and enrollment or acceptance into an accredited master's degree-granting nursing program in either anesthesia or nurse practitioner/midwife specialty areas. Candidates were granted full pay and allowances, but were given no tuition, book or fee allowances. Candidates incurred a three year initial active duty obligation while in school. Upon graduation, the obligation changed to three years active duty service for the first year of schooling and another 6 months for every additional 6 months of school or portion thereof. There was a total military service obligation of eight years.

TABLE I. Nurse Corps Accession Initiatives Summary

SOURCE	EDUCATION	AGE	TIME	PAY	OBLIGATION
NROTC	-managed by CNET -GPA 3.0 -enter any yr	commission before 35	4 yr max	-tuition, books, fees, uniforms -$100/mo	-4 yrs ACS -8 yr total oblg (SELRES or IRR)
NCP	-managed by CNRC -GPA 3.0 -in 2nd or 3rd yr BSN program	commission before 35	24 months max	-$500/mo -$5000 bonus	-4 yrs for 1st yr -5 yrs for 2nd yr -8 yr total oblg (SELRES or IRR)
MECP	-managed by NSHS -GPA 2.5 -open to all ratings -enrolled or accepted BSN -completed 1 yr educ	commission before 35	36 months max	-rating pay/alw	-4 yrs ACS
Direct	-managed by CNRC -must have BSN	20-35	na	-O1 is entry level -elig for entry grade credit	-3 yr ACS w/o -4 yr w/ bonus -8 yr total oblg (SELRES or IRR)
HSCP/ BDCP	-managed by NSHS -GPA 3.0 -enrolled or accepted in BSN program -completed 2 yrs educ	18-35	24 months max	-E3 pay/alw -promo to E5 possible	-4 yr ACS -8 yr total oblg (SELRES or IRR)
FTOST	-managed by NSHS -GPA 3.0 -must have BSN -enrolled or accepted in MSN program	able to complete 20 yr ACS before 55	27 months max	-O1 pay/alw -promo elig	-3 yrs for 1st yr, 6 mos for ea 6 mos or portion thereof -8 yr total oblg (SELRES or IRR)

Source: Derived from informational chart obtained from MED-524; dated 29 Nov 94; revision #6.

6. Summary

Table I indicates the requirements, benefits, and incurred obligations for all accession sources discussed above. It is presented to provide a quick overview.

B. CURRENT ARMY & AIR FORCE NURSE CORPS ACCESSION POLICIES

1. U.S. Army Nurse Corps

According to Lieutenant Colonel Fryer from the Army's Recruiting Headquarters, the Army NC uses US Army Recruiting (USAREC) and ROTC to access nurses. USAREC recruits direct accessions and manages the Army Medical Department Enlisted Commissioning Program. The Army Nurse Candidate Program is currently on 'hold' in terms of active recruiting for additional applicants. Additionally, ROTC also has a direct accession source through its scholarship program, and the Green-to-Gold program for enlisted soldiers to obtain a BSN degree.

2. U.S. Air Force Nurse Corps

According to a source in the Air Force Surgeon General's office, the Air Force NC currently recruits only registered nurses with more than one year of experience as direct procurements. Using ROTC scholarships, 60-75 new graduates are accessed each year. A few more individuals are accessed annually via the Airman Education and

Commissioning Program(AECP), which is a line-managed program to attend school full time to qualify for a commission in the NC. "Med Techs" who have completed a BSN in their off duty time are also actively solicited for enlisted commissioning. And finally, a program called the Health Provider Scholarship Program(HPSP) is being initiated for Air Force Academy grads who want to enter the NC using the combined BSN/MSN program at Vanderbilt University with up to five graduates per class expected in the near future. The Air Force is also reviewing the Navy NC program for enlisted education and commissioning, the MECP, as a future accession source possibility.

The Air Force Nurse Corps anticipates meeting future accession goals through ROTC, enlisted commissioning, and less than 100 annual direct accessions.

C. NURSING POOL

The uniqueness of military nursing is explained best in the *Department of Health and Human Services Military Nurses Task Force Report*. It states that the difference between professional nursing practice in the military and civilian sectors is found in the oath taken by Nurse Corps Officers upon induction into the service. A Navy Nurse takes on a dual role, encompassing the responsibilities of both

military officer and professional nurse. As a commissioned officer, the Navy Nurse must be capable of providing leadership, management, and planning expertise. There are also physical and educational requirements, and an obligated service commitment to serve at any of a number of worldwide duty assignments for a specified period of time. These distinct aspects of military nursing may be viewed as either positive or negative incentives for the individual civilian nurse seeking employment. This is also true for the military nurse in deciding to remain in or leave the service.

Historical trends from before World War I through the Vietnam War showed that the Nurse Corps has been able to shrink or expand in number depending upon national wartime activities. A severe shortage of over 10,000 nurses was reported in 1944, despite the fact that fifty-two thousand Army and Navy nurses were serving on active duty. Each subsequent peace or conflict period witnessed a mirroring decrease or increase in the requirement for active duty nurses. During the late eighties, however, there was uncertainty as to whether similar expansion was possible given the then current civilian sector nursing environment.

In 1988, despite consistent growth in the overall number of Registered Professional Nurses, the supply was not

adequate to satisfy the civilian sector demand. This shortage had an increasing impact on the military services' recruiting capabilities. Recruiters had difficulty attracting qualified nurses. They reported that the labor market was very competitive and that the relatively low, entry-level military salary was not sufficient to attract nurses who could obtain thousands of dollars a year more in the civilian sector. Medical, dental, educational, and retirement benefits, which were once strong incentives for military service, were being offered by civilian institutions in large benefit packages. The most difficult specialties for Navy recruiters were critical care, operating room, and anesthesia practice areas. To combat this difficulty, numerous recruiting and retention initiatives were instituted in FY90.

In order to understand these incentives, the military planning process should be examined. It is inadequate to describe a military nursing shortage based solely on economic indicators. Essential elements of the planning process are the constraints imposed by a fixed federal budget, organizational and mission requirements found in the military health care system, and Navy Nurse recruitment time.

Funding for the military health care system is obtained from Congress through a biennial process in which budgetary projections are made for a two-year period. An annual review of projections is planned. However, unanticipated increased requirements or supply shortages which occur during that two-year period may be impossible to address on short notice.

Several organizational and mission conditions exist within the military health care system that influence the requirements for nursing personnel. First, personnel are allocated to funded positions in military installations based on the priorities placed on the positions being filled. Priority of billet assignment is operational, overseas, isolated duty, congressionally mandated commands, major teaching hospitals, minor teaching hospitals, and finally, other US facilities.

Second, military nurses are expected to assume numerous responsibilities involving other clinical support services due to a potential lack of administrative support at some treatment centers. This could potentially affect the quality and quantity of professional nursing care for patients, and negatively influence the ability to staff units according to calculated workload hours. Any additional responsibilities impact the force structure

planning process. Finally, the older physical plant of certain treatment facilities affects nursing personnel efficiency in delivering patient care, thus possibly requiring more nurses than expected to complete assigned tasks.

Recruitment time for military nurses is not measured the same as for civilian nurses. In the civilian arena, as demand increases, nurses can generally be hired to fill the need. However, active duty accession goals for each fiscal year are set according to fixed, budgeted authorizations based on requirements established in previous years and the number of individuals expected to retire, separate, or resign. Goals are considered met if the number of accessions match or exceed the recruitment goal.

Other factors also muddled the military nursing shortage issue of the late eighties. These include the vacancy rates of non-military nurses at federal institutions, the fluctuation in volunteer usage, the use of temporary and contract services for nursing or ancillary services, service reductions due to understaffing, inadequate paraprofessional support, and "hidden" indicators. Hidden indicators include, undocumented and uncompensated overtime and the lack of differential pay for working holidays, weekends, shift rotation, or on call time.

Factors affecting the overall demand for military nurses are related to an increasing demand for the number of nurses, increased patient acuity, and expansion of the services provided by nurses. Factors affecting the supply for military nurses are related to nursing school enrollments and admissions, expanded career opportunities for women in and out of the military, declining nursing school student populations, decreased education subsidies, lower prevailing wage rates, possible retention difficulties, the effect of AIDS, the image of nurses, and military service restrictions and obligations. Military service restrictions include, age, physical fitness, professional qualifications, assignment location, family impacts, benefits, and obligated service periods.

In 1988, the Military Nurses Task Force recommended numerous strategies to minimize the impact of civilian sector nurse shortages on the military health services system, including the development of new accession sources. Many of these recommendations were instituted and the "new" accession sources are analyzed in this research.

By the end of FY97, the Navy NC had approximately 3,250 active duty officers in the grades of Ensign through Rear Admiral (Upper Half). These individuals were accessed through a variety of sources over the past three decades.

Nursing market issues must be monitored closely by the Navy Medical Department if an adequate supply of military nurses is to be maintained in the future.(Department of Health and Human Services Report)

D. MEASURES OF "SUCCESS"

The first measure of success that will be used for the purposes of this thesis is: completion of initial obligated service. This is instrumental in indicating an individual's "stick-to-it-iveness." Attrition during this period is one of the most costly losses for the military. The military provides nurses considerable costly "front-end" training while paying a stipend or full wages. This is more evident with the ROTC, stipend, FTOST, and enlisted training programs than it is with direct accessions.(Cooke and Quester)

The second measure of success, retention beyond initial obligated service, is the first indicator of "stayer" behavior. A decision to remain in the Navy after completing the initial obligation can be interpreted as a decision to build a Navy medical career.(Dolfini) Additionally, retention beyond obligated service is generally the period when the military begins to recover initial training costs. However, given the varied cost range of the "new" accession sources, and the difficulty in ascertaining an individual

officer's national defense contribution, it is difficult to pinpoint exactly when initial training costs are recouped.(Bowman, 1995)

The third measure of success, promoting to LCDR, indicates that an officer will commit to stay for a twenty year career and that they have successfully met the "first actual screening process applied by the military employer."(Bowman, 1995)

A performance index was not used in this study for several reasons. First, the new fitness report grading system has only been used since FY95. More time must elapse for the grades to be considered reliable when using them for evaluating aggregate cohort behavior. Secondly, results obtained by Foster, Nolan and Farr on various officer communities, using a "contrived" performance index are questionable at best.(Foster)(Nolan)(Farr)

E. QUALITATIVE BENEFIT-COST ANALYSIS

As defined by Weimer and Vining, a benefit-cost analysis provides a framework for evaluating the economic efficiency of policies. Net benefits are calculated to determine whether a policy generates sufficient benefits so that those who bear its costs could at least potentially be compensated so that some people could be made better-off without making anyone worse-off. It must be decided in

advance what effects are relevant in calculating net benefits, and the concepts of opportunity cost and willingness to pay must be applied.

When important efficiency impacts cannot be monetized, it becomes impossible to directly calculate the dollar value of net benefits. Instead, qualitative assessments of the various non-monetized impacts must be provided. Rather than attempt difficult and time-consuming valuations, theoretical arguments to estimate orders of magnitude on efficiency impacts are often applied. Professional economists sometimes resort to qualitative benefit-cost analyses when writing about policy issues.(Wiemer and Vining)

The Congressional Budget Office analyzed officer commissioning programs and stated that purely quantitative officer performance measures may not capture important qualitative differences. They concluded that an officer commissioning program might be justified if the program is better at identifying or inculcating qualities such as leadership, suitability for command, and intangible personal qualities. (CBO paper)

Accession sources should be designed to minimize costs and maximize resources, while ensuring that the best-qualified applicants are selected for commissioning. This applies to the NC as well as to other officer programs.

Although NC commissioning programs have the same mission, each program serves different purposes. The following information describes the various procurement programs' particular features.

All new NC officers must attend Officer Indoctrination School (OIS), with the exception of some NROTC accessions. This is a six-week course conducted in Newport, Rhode Island. It assists the newly-commissioned staff corps officer's transition into the Naval officer role. The newly commissioned NC Officer is then transferred to their first duty station for a period not less than two years. Except under special circumstances, this assignment will be to a major teaching hospital within the United States.

NROTC is less costly, in quantitative terms, than the Naval Academy in providing highly-educated and well-trained Naval Officers. NROTC graduates have a high "taste" for military service or they would not have entered this program. They also exhibit a high degree of "stick-to-it-iveness" the longer they are in the program. They receive substantial training and education directly related to the Navy, and are extremely productive officers. These characteristics make this an ideal source for the majority of new officers.(Foster)

NCP graduates, in general, blindly enter both the military and nursing professions. After receiving a monthly stipend and a bonus, they are plunged into the military and nursing arenas and are expected to perform as dual professionals, military leaders and nursing clinicians, immediately after graduation.

MECP accessions provide the NC community with a pool of military enlisted-experienced applicants that may have a medical background. Graduates from this source have a high "taste" for military service and a proven "stick-to-it iveness" character because they have completed their enlisted service.(Cooke and Quester) This program provides enlisted personnel upward mobility to move into the commissioned ranks. In addition, MECP graduates for the Medical Service Corps have historically had higher retention rates than direct accessions without service.(Dolfini)

Direct procurement provides the NC community with a pool of well-qualified applicants that have prior nursing backgrounds and possibly prior enlisted or officer experience outside the Nurse Corps. This short pipeline procurement option provides a flexible and relatively inexpensive means to meet annual endstrength requirements. This source can also help to meet specialty area

requirements by offering entry grade credit for advanced education or experience.

F. OTHER ATTRITION, RETENTION, AND PROMOTION STUDIES

In one last study worth mentioning, Lakhani analyzed retention behavior of Army junior officers using a cost-benefit multidisciplinary approach. This study is pertinent because it integrated information on satisfaction with military life and retention behavior results, and then performed a cost-benefit analysis for four separate commissioning sources. The results revealed that retention could be improved by increasing satisfaction with military life, pay, and perceived chances of promotion. The results also showed that it may be more cost-effective to offer a cafeteria style benefits package. These results could have significant implications for the NC considering the highly competitive civilian nursing market that recruiters face daily.(Lakhani)

III. DATA AND METHODOLOGY

This chapter explains the data sets, explanatory variables and methodology used to examine the relationship between accession source and military careerist behavior.

A. DATA

Two data sources were used for this study. The first source consists of extracted fields for the 29XX community. This data was separated into three fiscal year cohorts from larger cohort files developed by Judy Willis at the Naval Postgraduate School (NPS). The master cohort files are generated from the Navy Officer Master File (OMF) and from the Master Loss and Reserve Files at the Defense Manpower Data Center (DMDC). The three fiscal year cohort data sets were merged with specified Nurse Corps fields from a second source, the Bureau of Medical Information System (BUMIS) database from the Naval Medical Information Management Center (NMIMC).

The resultant product is one data set containing three separate cohorts. The cohort files track a population of NC officers from a specific beginning point to a specific endpoint. Within this study, the sample population includes only active duty entrants into the NC for FY83, FY87, and FY90. The three cohorts are then tracked through the end of

FY97. Using three cohorts was necessary to ensure a sufficiently large sample and to dampen any unique events to which any one cohort may have been subject.

The active commissioning base date (ACBD) is the referent date used in this study for entry into the NC. Recalls and interservice transfers have been deleted from our entrant population because there were problems using this date. Individuals who are classified as having changed their designators were also deleted from our population; their military history cannot be traced. Finally, the BUMIS database uses the report to active duty date as the gain date. Therefore, our entrant numbers may be slightly different from those found in NMIMC reports, where the gain date is used. Using the ACBD does not pose a problem for this research because the deleted observations are small in number and percentage of the population.

Fiscal year is used instead of the individual's year group because of the difficulties that the NC presents when granting entry grade credit for either experience or education, as discussed later in the data section. Further discussion of the year group variable can be found in the results section.

Cohort data is used so that individuals may be tracked longitudinally as appropriate to examine their staying or

leaving behavior. After individual cohort behavior is analyzed, behavior comparisons among the three cohorts are then made.

Aggregate data is not used because this would involve analyzing the entire NC as one grouping. This would not take into account factors such as fluctuating external market issues or changing internal accession policies. Additionally, predictive powers would be limited for future accessions if aggregate data were used.

FY83 is chosen for analysis because all entrants during this time period have either been promoted to the rank of LCDR or are no longer on active duty as of the end of FY97. Also, this time frame pre-dates offering accession bonuses to direct procurements and the newer accession sources available to later cohorts. FY87 is chosen for analysis because the nursing shortage became an issue at that time and accession bonuses were granted; it pre-dates the new accession sources. FY90 is analyzed because it is the most up-to-date cohort that could be acquired from DMDC with sufficient time elapsed to measure stay or leave decisions. FY90 has accessions from almost all of the new sources, it allows tracking of individuals through their initial service obligation period, and it indicates whether they retained beyond initial obligated service.

Table II indicates the cohort sample sizes and the percent of the endstrength population they represent that year. There are missing observations for FY83, however, it could be safely assumed that the majority of these individuals were direct accessions since the only entrant possibilities available in FY83 were direct, FTOST, recall to active duty and interservice transfer.

TABLE II. Cohort Sample Sizes

	FY83	FY87	FY90
Endstrength*	2662	3104	3057
Accessions	428	261	338
Missing Obs**	221	11	28
Sample Size	207	250	310
Sample as % ES	7.78%	8.05%	10.14%
Sample as % Accessions	48.36%	95.79%	91.72%

*Obtained from the BUMIS database.
**Includes deleted observations.

Tables III and IV define the variables from the database and the variables used in the regression analysis, respectively. Variables used in the logit analysis are clearly labeled when presented in their corresponding tables.

TABLE III. Description of database variables

VARIABLE	DESCRIPTION
ACBD	Active Commissioning Base Date
ADISCWSP	Loss Category, Administrative Discharge with Separation Pay
BDCP	Gain Category, Baccalaureate Degree Completion Program
BNPT	Basic nursing preparation level

CURPG	Current Paygrade Code
CURYG	Current Year Group
DEATH	Loss Category, Death
DIRECT	Gain Category, Direct Procurement
DISCOTH	Loss Category, Discharge (other)
DISCPHY	Loss Category, Discharge (physical)
DOB	Date of Birth
FTOST	Gain Category, Full-time Out-service Training
GCAT*	Gain Category Code
GENDER	Gender
HSCP	Gain Category, Health Services Commissioning Program
LCAT*	Loss Category Code
LOSSD	Loss Date
LOSSPG	Loss Paygrade Code
MECP	Gain Category, Medical Enlisted Commissioning Program
NAB	Gain Category, Nurse Accession Bonus
NCP	Gain Category, Nurse Commissioning Program
NROTC	Gain Category, Naval Reserve Officer Training Corps
PRI	Dependency Status Code
PRVOVR	Previous Enlisted Service Over 4 Years
RACE	Race Code
RANK	Rank at Time of Accession Code
RELEASE	Loss Category, Released from active duty
RELWLS	Loss Category, Released with lump sum
RESIG	Loss Category, Resigned Commission
RETOTH	Loss Category, Retired (other)
SSC1	Sub-Specialty Code, Primary

Note: * obtained from the BUMIS database.

TABLE IV. Description of Created Variables

VARIABLE	DESCRIPTION
AND	Basic Nursing Preparation Category, Associate's Degree in Nursing
BSN	Basic Nursing Preparation Category, Baccalaureate Degree in Nursing
CIOS**	Value of 1 if completed initial obligated service; otherwise 0
COMMAGE	Age at time of commissioning; continuous value 21 to 46
COMMYR	Fiscal year individual was commissioned
DIPLOMA	Basic Nursing Preparation Category, Nursing Diploma
DIRECT	Value of 1 if direct procurement; otherwise 0
ENS	Rank Category, Ensign
FEMALE	Value of 1 if female; otherwise 0
GCAT	Value of 1 if direct; otherwise 0
LT	Rank Category, Lieutenant
LTJG	Rank Category, Lieutenant Commander
MALE	Value of 1 if male; otherwise 0
MARRIED	Dependency Category, Married with no children
MWKIDS	Dependency Category, Married with children
MECP	Value of 1 if Medical Enlisted Commissioning Program; otherwise 0
MSN	Basic Nursing Preparation Category, Master's Degree in Nursing
NAB	Value of 1 if Nurse Accession Bonus; otherwise 0
NON-WHITE	Value of 1 if non-white; otherwise 0
NOPRIOR>4	Indicates no prior enlisted service over 4 years
PG04**	Value of 1 if completed initial obligated service, retained beyond obligated service, and promoted to lieutenant commander (O4); otherwise 0
PRIOR>4	Indicates completed over 4 years of enlisted service
RETAIN**	Value of 1 if completed initial obligated service and retained beyond initial obligated service; otherwise 0

SINGLE	Dependency Category, No Family
SWKIDS	Dependency Category, Single with children
STIPEND	Value of 1 if BDCP, HSCP, NCP, FTOST; otherwise 0
WHITE	Value of 1 if white; otherwise 0

Note: **dependent variables.

For analysis purposes, many of the variables were grouped to accommodate sufficient observation size. The following descriptions indicate how the groupings were accomplished.

The race independent variable observations were grouped according to a value of 1 if white, otherwise 0; all non-white races were aggregated because of the small numbers of individuals in these racial groups.

The dependency variable was grouped into two categories, single or family; family included single with children, married with no children, and married with children.

Sub-specialty codes were assigned a value of 1 if the individual was a professional registered nurse with a sub-specialty code of 1900, and 0 if holding any other sub-specialty code.

For logistical regression purposes, the NCP, BDCP, HSCP, and FTOST programs were combined. This was done because of the small numbers of accessions into each group. These groups are similar because they include training and

up-front funds with the active duty service obligation following graduation.

For the NC, unlike most other line communities, the variable CURYG, current year group, does not necessarily indicate entrance into the service. Entry grade credit may have been granted to an applicant if warranted by advanced education or experience. This is a complicated process that may grant higher rank and/or simply back date an official date of rank as per SECNAVINST 1120.6A.

B. METHODOLOGY

The methodology used in this project parallels that used by Bowman in his 1990 study, *"Do Engineers Make Better Naval Officers?,"* and the Cooke and Quester 1992 study, "What Characterizes Successful Enlistees in the All-Volunteer-Force: A Study of Male Recruits in the U.S. Navy." We examined officer records at three success points using multivariate logit regression techniques. Causal factors are related to dichotomous outcomes to examine the relationship between accession source and three separate military career milestones.

We modeled our first measure of success, completing initial service obligation, as a function of accession source and other control variables. The model estimated is:

$$Pr\ (Y_i = 1) = \beta X_i + \alpha Z_i + \varepsilon_i$$

where Y_i is the probability of completing initial service obligation, 1 = yes;

X_i is the accession source; and

Z_i is the vector of other control variables (as noted in Table V).

The estimates for β provide an estimate of the relationship between accession source and completing initial service obligation.

We also modeled our second and third measures, retention beyond initial obligated service and promotion to lieutenant commander, respectively, as a function of accession source and other control variables, in the same manner.

The second career point assumes an individual completed their initial obligated service. The second β estimates the relationship between accession source and retention beyond initial obligated service.

The final measure of success, promotion to lieutenant commander, assumes an individual completed their obligated service and retained beyond initial obligated service. The estimates for this β estimate the relationship between

accession source and promotion to the rank of lieutenant commander.

Multivariate regression analysis is used in this study to show the incremental changes in an explanatory variable holding everything else constant. Explanatory variables should "explain" the reasons for changes in the value of the dependent variable being measured. In contrast, logit models are used to measure probabilities for completion of obligated service, retention beyond obligated service, and promotion to LCDR, using various explanatory variables.

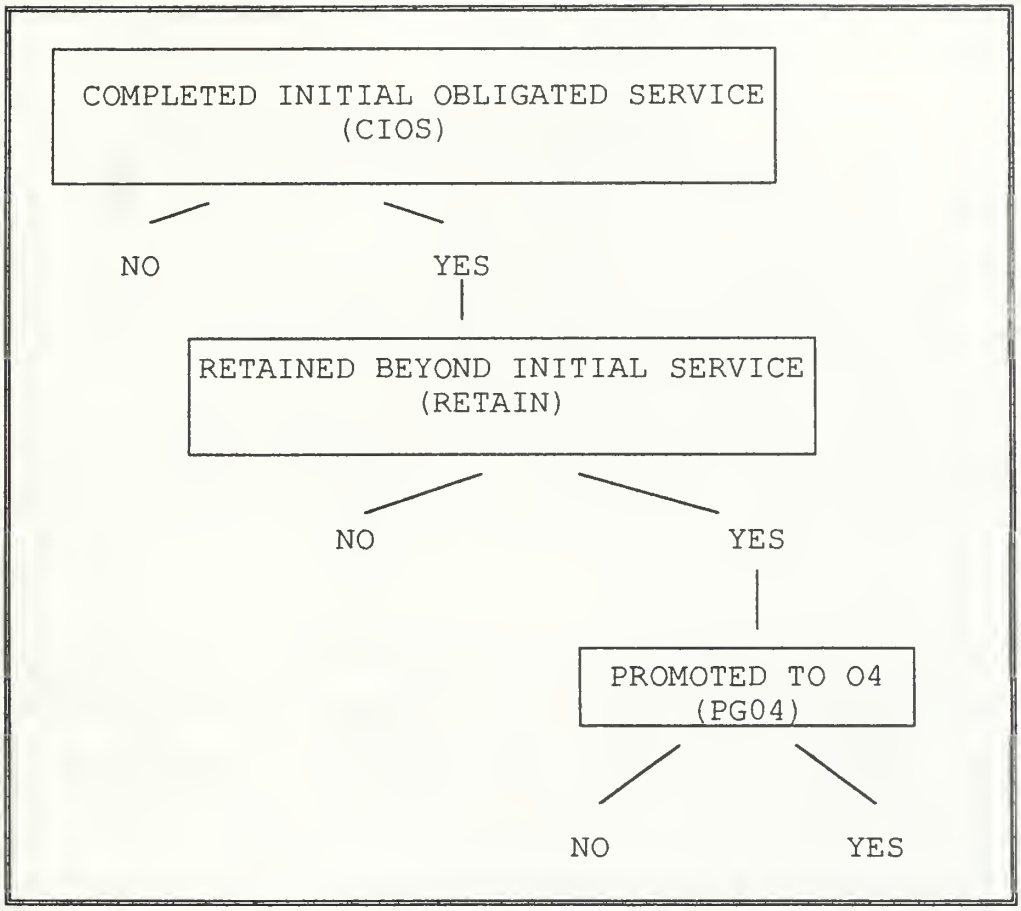
Table V presents the models used in the multivariate analysis. Variables are defined in Tables III and IV, above.

Table V. Multivariate Models

Logit Models:
CIOS = f(DIRECT, MECP, NAB, STIPEND, MALE, FEMALE, WHITE, NON-WHITE)
RIOS = f(DIRECT, MECP, NAB, STIPEND, MALE, FEMALE, WHITE, NON-WHITE)
PROM = f(DIRECT, MECP, NAB, STIPEND, MALE, FEMALE, WHITE, NON-WHITE)

Table VI is the decision tree used to make the logit model. Variables are defined in Tables III and IV, above.

Table VI. Decision Tree of Model



IV. RESULTS

A. BIVARIATE/DESCRIPTIVE RESULTS

Tables VII through XXI indicate the sample sizes, demographics, and categorical "success" descriptions of accessions for FY83, FY87, and FY90, using frequency tables.

Table VII displays the progression from purely direct procurement in FY83 to the training pipeline which began in FY90.

TABLE VII. Distribution and Percentage by FY and GAIN CATEGORY

GAIN CATEGORY	FY83 N (%)	FY87 N (%)	FY90 N (%)
NROTC			1 (0.3)
MECP		14 (5.6)	24 (7.7)
DIRECT	207 (100)	235 (94.0)	46 (14.8)
NAB			156 (50.3)
HSCP			44 (14.2)
BDCP			26 (8.4)
FTOST		1 (0.4)	13 (4.2)
TOTAL	207 (100)	250 (100)	310 (100)

Table VIII indicates a slightly higher percentage of female accessions for FY87, however, the gender ratio over all three cohorts reflects the overall Navy Nurse Corps population.

TABLE VIII. Distribution and Percentage by FY and GENDER

GENDER	FY83 N (%)	FY87 N (%)	FY90 N (%)
FEMALE	160 (77.3)	208 (83.2)	245 (79.0)
MALE	47 (22.7)	42 (16.8)	65 (21.0)
TOTAL	207 (100)	250 (100)	310 (100)

Table IX shows a slight increase in the Nurse Corps' racial diversity. This is illustrative of the Navy initiative to recruit a force more representative of the civilian populous.

TABLE IX. Distribution and Percentage by FY and RACE

RACE	FY83 N (%)	FY87 N (%)	FY90 N (%)
WHITE	190 (91.8)	228 (91.2)	275 (88.7)
BLACK	14 (6.8)	15 (6.0)	22 (7.1)
OTHER	3 (1.4)	7 (2.8)	13 (4.2)
TOTAL	207 (100)	250 (100)	310 (100)

Table X exhibits the trend that the entire Navy currently must face. There is a distinct increase in the number of accessions entering the service with children. It should also be noted that the percent of single individuals is decreasing.

TABLE X. Distribution and Percentage by FY and FAMILY STATUS

FAMILY STATUS	FY83 N (%)	FY87 N (%)	FY90 N (%)
SINGLE	148 (71.5)	172 (69.1)	172 (55.7)
SINGW/CHD	9 (4.3)	18 (7.2)	26 (8.4)
MARRIED	26 (12.6)	26 (10.4)	44 (14.2)
MARRW/CHD	24 (11.6)	33 (13.3)	67 (21.7)
MISSING VALUE		1 (*)	1 (*)
TOTAL	207 (100)	250 (100)	310 (100)

*less than 1 percent

Table XI illustrates the increasing dependence on the vital recruitment of enlisted sailors as a source for nurses. This reflects the policy that the NC has adopted, much like the Medical Service Corps, of "growing" their supply of health care administrators. There is a noticeable increase in the percent of procurements with greater than four years prior enlisted service time from FY83 to FY90.

TABLE XI. Distribution and Percentage by FY and PRIOR SERVICE OVER FOUR YEARS

VARIABLE	FY83 N (%)	FY87 N (%)	FY90 N (%)
PRIOR>4YRS	18 (8.7)	28 (11.2)	53 (17.1)
NOPRIOR>4Y	189 (91.3)	222 (88.8)	257 (82.9)
TOTAL	207 (100)	250 (100)	310 (100)

Basic nursing preparation training results, as shown in Table XII, describe only basic entry-level nursing

education. It should be noted that an individual may have either a higher educational or nursing attainment level at the time of commissioning than is reflected by this variable.

TABLE XII. Distribution and Percentage by FY and BASIC NURSING PREPARATION TRAINING

VARIABLE	FY83 N (%)	FY87 N (%)	FY90 N (%)
BSN	172 (83.1)	215 (86.0)	261 (84.7)
MSN	1 (0.5)		
DIPLOMA	34 (16.4)	35 (14.0)	42 (13.6)
AND			5 (1.6)
MISSING VALUE			2 (*)
TOTAL	207 (100)	250 (100)	310 (100)

The information in Table XIII may appear somewhat deceptive for FY90. This data reflects both the shift from direct procurement to the training pipeline and the application of constructive credit. Table XIV illustrates the use of constructive credit during FY90, when accessions through FTOST and the direct pathways received advanced rank for either additional educational or experiential backgrounds.

TABLE XIII. Distribution and Percentage by FY and RANK AT COMMISSIONING

VARIABLE	FY83 N (%)	FY87 N (%)	FY90 N (%)
ENS	174 (84.1)	235 (94.0)	207 (66.8)
LTJG	18 (8.7)	14 (5.6)	60 (19.4)
LT	15 (7.2)	1 (0.4)	43 (13.9)
TOTAL	207 (100)	250 (100)	310 (100)

TABLE XIV. Distribution and Percentage of RANK AT COMMISSIONING by GAIN CATEGORY for FY90

GCAT	ENS	LTJG	LT	TOTAL
ROTC	1 (0.3)			1 (0.3)
MECP	24 (7.7)			24 (7.7)
DIRECT	21 (6.8)	14 (4.5)	11 (3.6)	46 (14.8)
NAB(BONUS)	88 (28.4)	42 (13.6)	26 (8.4)	156 (50.5)
HSCP	44 (14.2)			44 (14.2)
BDCP	26 (8.4)			26 (8.4)
FTOST	3 (1.0)	4 (1.3)	6 (1.9)	13 (4.2)
TOTAL	207 (66.8)	60 (19.4)	43 (13.9)	310 (100)

Table XV displays statistics indicating results of age at commissioning and loss in years (length of service) comparisons. The average age at commissioning has remained stable, however, the range increased by ten years. It is also noteworthy that the average loss in years (length of service) has been cut in half.

TABLE XV. SAMPLE SIZE MEAN, MINIMUM, AND MAXIMUM FOR AGE AT COMMISSIONING AND LOSS IN YEARS (LENGTH OF SERVICE) BY FY

VARIABLE	VALUES	FY83	FY87	FY90
COMMAGE	N	207	250	310
	MEAN	26.7	26.3	28.7
	STD DEV	3.7	4.0	5.6
	MIN	21.1	21.1	21.5
	MAX	34.9	34.9	44.3
LOSINYR	N	104*	181**	170#
	MEAN	8.4	4.4	4.3
	STD DEV	2.3	2.2	1.4
	MIN	5.2	1.2	1.1
	MAX	14.0	10.3	7.5

* 3 loss date values are missing, 107 actual losses.
** 6 loss date values are missing, 187 actual losses.
# 15 loss date values are missing, 185 actual losses.

Table XVI shows the retention rates for each cohort as of the end of FY97. The drastic drop in retention rate for the FY87 cohort is one reason that the training pipelines were instituted. Keep in mind that the time frame for each of these retention rates is 14, 10 and 7 years, respectively. Therefore, the FY90 retention rate, should be interpreted carefully.

TABLE XVI. Distribution and Retention Rate by FY as of the end of FY97

	FY83	FY87	FY90
Accession Population	207	250	310
Loss N	107	187	185
RETENTION RATE	48.3%	25.2%	40.3%

Loss categories at the end of FY97 for each of the cohorts are summarized in Table XVII. Release from active duty and discharge for other reasons should be assessed carefully, considering the time difference that each cohort covers; 14, 10, and 7 years, respectively.

TABLE XVII. Distribution and Percentage by FY and LOSS CATEGORY

VARIABLE	FY83 N (%)	FY87 N (%)	FY90 N (%)
RELEASE	35 (32.7)	147 (78.6)	133 (71.9)
RESIGN	33 (30.8)	9 (4.8)	15 (8.1)
RETIRE(OTH)	10 (9.3)	14 (7.5)	12 (6.5)
ADMDISWSP	20 (18.7)	4 (2.1)	4 (2.2)
REL WLS	3 (2.8)	8 (4.3)	6 (3.2)
DIS (PHYS)	4 (3.7)	2 (1.1)	4 (2.2)
DIS (OTH)	2 (1.9)	3 (1.6)	11 (5.9)
TOTAL	107 (100)	187 (100)	185 (100)

Table XVIII looks at the loss category by the gain category for the FY90 cohort. It should be noted that three-fourths of the losses are either bonus recipients or BDCP/HSCP graduates. The prominent loss category is release from active duty for all gain categories.

TABLE XVIII. Distribution and Percentage of LOSS CATEGORY BY GAIN CATEGORY for FY90

FREQ PERCENT ROW PCT COL PCT	NROTC	MECP	DIRECT	NAB (BONUS)	BDCP/ HSCP	FTOST	TOTAL
RELEASE	1 0.54 6.67 100.00	3 1.62 2.26 75.00	20 10.81 15.04 71.43	72 38.92 54.14 69.23	34 18.38 25.56 80.95	4 2.16 3.01 66.67	133 71.89
RESIGN			4 2.16 26.67 14.29	7 3.78 46.67 6.73	2 1.08 13.33 4.76	1 0.54 6.67 16.67	15 8.11
RETIRE (OTHER)		1 0.54 8.33 25.00		7 3.78 58.33 6.73	4 2.16 33.33 9.52		12 6.49
ADMIN DISCHG W/SP			1 0.54 25.00 3.57	3 1.62 75.00 2.88			4 2.16
RELEASE W/LUMP SUM			1 0.54 16.67 3.57	4 2.16 66.67 3.85		1 0.54 16.67 16.67	6 3.24
DISCHG (PHYS)			1 0.54 25.00 3.57	3 1.62 75.00 2.88			4 2.16
DISCHG (OTHER)			1 0.54 9.09 3.57	8 4.32 72.73 7.69	2 1.08 18.18 4.76		11 5.95
TOTAL	1 0.54	4 2.16	28 15.14	104 56.22	42 22.70	6 3.24	185 100.00

Tables XIX through XXI indicate the distribution and percentage of each cohort by gain category for each of the three "success" measures. The FY83 cohort only has direct procurement as a possible gain source, and all subjects in

the sample completed and remained beyond the obligated service period. Six and thirty-three nurses, respectively, did not complete their obligated service from the FY87 and FY90 cohorts.

TABLE XIX. Distribution of Subjects by FY, GAIN CATEGORY, and COMPLETED INITIAL OBLIGATED SERVICE (CIOS)

	SOURCE	CIOS N		CIOS PERCENT(%)		TOTAL N
		YES	(NO)	YES	(NO)	
FY83	Direct	207	(0)*	100	(0)*	207
FY87	MECP	14	(0)	5.6	(0)	
	Direct	230	(5)	92.0	(2.0)	250
	FTOST	0	(1)	0.0	(**)	
FY90	NROTC	1	(0)	0.3	(0)	
	MECP	23	(1)	7.4	(0.3)	
	Direct	42	(4)	13.6	(1.3)	
	NAB(Bonus)	137	(19)	44.2	(6.1)	
	BDCP/HSCP	62	(8)	20.0	(2.6)	310
	FTOST	12	(1)	3.9	(0.3)	

*(#) Indicates number/percent of unsuccessful officers.
** less than 1 percent.

As shown in Table XX, in the FY87 cohort, almost half of the direct accessions failed to remain beyond their initial obligated service, yet all of the MECP graduates remained. In the FY90 cohort, again almost half of the direct accessions and BDCP/HSCP graduates failed to remain beyond their initial obligated service. However, all but one MECP graduate and all FTOST graduates remain in the Navy.

TABLE XX. Distribution of Subjects by FY, GAIN CATEGORY, and RETAINED BEYOND INITIAL OBLIGATED SERVICE (RETAIN)

	SOURCE	RETAIN N YES (NO)	RETAIN PERCENT(%) YES (NO)	TOTAL N
FY83	Direct	207 (0)*	100 (0)*	207
FY87	MECP	14 (0)	5.7 (0)	
	Direct	130 (100)	58.3 (41.0)	244^
	FTOST	0 (0)	0.0 (0)	
FY90	NROTC	0 (1)	0.0 (0.4)	
	MECP	22 (1)	7.9 (0.4)	
	Direct	32 (10)	11.6 (3.6)	
	NAB(Bonus)	93 (44)	33.6 (15.9)	
	BDCP/HSCP	42 (20)	15.2 (7.2)	277^^
	FTOST	12 (0)	4.3 (0.0)	

* (#) Indicates number/percent of unsuccessful officers.
** less than 1 percent.
^ 6 subjects did not complete initial obligated service.
^^ 33 subjects did not complete initial obligated service.

The results in Table XXI must be examined with care. Ninety-five subjects did not promote in FY83, but it is not known why or when they did not promote. The N of 207 only includes subjects who remained beyond initial obligated service. These individuals could have exited at any time prior, during, or after their opportunity window for promotion to LCDR. The results for FY87 and FY90 cohorts are also somewhat suspect because their opportunity windows are also unknown. The figures for all cohorts only indicate the number of individuals selected for LCDR by the end of FY97.

TABLE XXI. Distribution of Subjects by FY, GAIN CATEGORY, and PROMOTED TO LCDR (PGO4)

	SOURCE	PGO4 N YES	(NO)	PGO4 PERCENT(%) YES	(NO)	TOTAL N
FY83	Direct	112	(95)*	54.1	(45.9)*	207
FY87	MECP	5	(9)	3.5	(6.3)	
	Direct	56	(74)	38.9	(51.4)	144^
	FTOST	0	(0)	0.0	(0)	
FY90	NROTC	0	(0)	0.0	(0.0)	
	MECP	0	(22)	0.0	(11.0)	
	Direct	10	(22)	5.0	(11.0)	
	NAB(Bonus)	14	(79)	7.0	(39.3)	
	BDCP/HSCP	0	(42)	0.0	(20.9)	201^^
	FTOST	6	(6)	3.0	(3.0)	

* (#) Indicates number of unsuccessful officers.
** less than 1 percent.
^ 100 subjects did not retain beyond initial obligation.
^^ 76 subjects did not retain beyond initial obligation.

B. MULTIVARIATE ANALYSIS

In spite of the small sample sizes, we attempted to use multivariate analysis to estimate the relationships between gain category and completing initial obligated service and retention beyond obligated service, while controlling for several independent variables. Because of the small sample sizes, a quasi-complete separation of the sample points continued to occur in all models but the final product, as described in Table V of the methodology section. Initial models included age at commissioning, dependency status, basic nursing preparation level, sub-specialty status, rank at entry, and prior enlisted service over four years. The

large amount of multi-collinearity between these variables required that the model be adjusted. For example, MECP, prior service, male, ensign, and sub-specialty code were found to be highly correlated.

To test for a relationship between the dependent and gain source (independent) variables, chi-square tests were performed. The results are summarized in Table XXII. The FY83 cohort was excluded because direct accession is the only possible gain source. There are only four degrees of freedom for FY90 because the NROTC gain category had only one accession; NROTC was deleted from the chi-square test statistic.

TABLE XXII. CHI-SQUARE STATISTIC FOR SUCCESS MEASURES AND GAIN CATEGORIES BY FY

	CHI-SQUARE	CIOS	RETAIN
FY87	DF	1	1
	VALUE	0.304	10.314
	PROB	0.581	0.001
FY90	DF	4	4
	VALUE	1.788	13.275
	PROB	0.775	0.010

Table XXII indicates there is a relationship between gain source and the success measure, remaining beyond initial obligated service for both the FY87 and FY90 cohorts.

The multivariate logit models were estimated by maximum likelihood techniques using completion of initial obligated

service and retention beyond initial obligated service as dependent variables. Tables XXIII and XXIV provide the signs and magnitudes of the estimated coefficients for the retention logit model for FY87 and FY90. The standard error of the coefficient estimates are listed in parentheses. The calculated change in probabilities associated with a one unit change in each explanatory variable is normally given for the model, to aid in interpreting the logit coefficients. However, none of the values were found to be significant, even at the .05 level. Therefore, changes in probabilities are not displayed.

TABLE XXIII. LOGIT ESTIMATES FOR RETENTION MODEL FOR FY87

INDEPENDENT VARIABLES	COEFFICIENT ESTIMATES
MECP	13.4070 (320.2)
MALE	1.3989 (0.771)*
NON-WHITE	0.3380 (0.4804)
INTERCEPT	0.0674 (0.150)
CHI-SQUARE FOR COVARIATES	25.914
CONCORDANCE RATIO	33.9
SAMPLE SIZE	244**

* significant at .01, possibly a quasi-complete separation in the sample points, validity of model fit is questionable
** 5 observations were deleted from the original sample due to inability to complete initial obligated service and 1 FTOST had been deleted due to small sample size

For FY87, in terms of the models' goodness-of-fit, the chi-square for covariates tests the significance of all of

the explanatory variables included in the model. In this case, the chi-square for covariates is 25.914 with 3 degrees of freedom. This is significant at the 0.0001 level. The concordance ratio of 33.9%, measures the models' predictive ability.

TABLE XXIV. LOGIT ESTIMATES FOR RETENTION MODEL FOR FY90

INDEPENDENT VARIABLES	COEFFICIENT ESTIMATES
MECP	1.8418 (1.0861)
NAB(BONUS)	-0.4612 (0.4061)
STIPEND	-0.2406 (0.4485)
MALE	0.1902 (0.3470)
NON-WHITE	0.4411 (0.4862)
INTERCEPT	1.1327 (0.3695)
CHI-SQUARE FOR COVARIATES	11.506
CONCORDANCE RATIO	48.9
SAMPLE SIZE	277*

* 33 observations were deleted from the original sample due to inability to complete initial obligated service

For FY90, in terms of goodness-of-fit, the chi-square for covariates is 11.506, with 5 degrees of freedom. This is significant at the 0.0422 level. The concordance ratio of 48.9 measures the models' predictive ability.

Based on the model used in this thesis, results indicate that gain category is related to retention beyond initial obligation. However, due to the small sample size and model limitations, no predictive powers can be implied

for the success measures of obligated service completion, retention beyond obligated service, or promotion to LCDR.

V. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

1. Discussion of Findings

Based on the results of this thesis, the empirical analysis indicates that accession source could be used to predict retention after developing a better fitting model. The initial chi-square results show that there appears to be a relationship between gain source and retention beyond initial obligated service. The model used in this thesis, however, does not capture the magnitudinal differences of each gain category. This could be due to the small sample size, the small gain category size, or the potential impact of omitted variables. Possible omitted variables include, first duty station, first job assignment, fitness report or performance data, GPA, school quality, or attendance at military or professional nurse training.

2. Policy Implications and Recommendations

The NC faces different challenges today than it did a decade ago. The biggest challenge for the 21st century, however, may be internal. Recruiting and retaining the best and brightest nurses is vital. Obtaining the right force mixture is essential to ensure that the NC has the proper elements to provide superior senior leadership in the

future. Attaining the "right" mix of nurses from the various accession sources cannot be adequately researched until sufficient time has elapsed for the currently planned procurements to have passed pre-determined retention and promotion career milestones. Data on entrants into the NC beginning in FY96 would be ideal.

Due to the ever-changing supply within the civilian nursing market, the emphasis should remain with "growing" the accession supply through a schools oriented accession policy. However, the following recommendations are offered to make better use of recruiting dollars. ROTC is still an unknown source due to the fact that FY90 only had one ROTC accession. Therefore, it should remain a viable source until further research indicates otherwise. MECP is an excellent source of military experience and has other advantages as discussed earlier in this research. It should remain as a vital source of accessions. Training accession pipelines are longer than the direct pipelines; as a result, they are less flexible. Additionally, as indicated by the results, direct accessions appear to have a higher retention rate. Therefore, direct accessions should be increased to a set minimum number, with the "valve" fluctuation capability still available to allow for immediate increases due to attrition in the training gain sources. This shifting of

numbers could be accomplished by decreasing the use of stipend programs such as the NCP. Stipend programs did not appear to have any significant value over other accession sources; they had lower retention, and can be very costly if losses occur before completion of obligated service.

The bonus option should be kept to entice civilian RN's during critical recruiting shortage periods and for recruiting specialists when necessary. When reviewing other accession source options, bonuses appear to be more cost-effective in the short term and have a short pipeline to active duty status.

B. OTHER RECOMMENDATIONS

The following suggestions are offered as a result of the extensive literature review, research, and personal experiences of the authors.

1. Consideration of Other Programs and Sources

a. Full-Time Out-Service Training (FTOST)

A strong source for advanced nurse practitioners is the FTOST program. Although not many individuals were accessed through this program, our results appear to indicate that accessions to the NC via this avenue have

stayed. There are many benefits to having advanced nursing preparation recruits and few drawbacks.

b. Technical Nurse Warrant Officer Program (TNWO)

In the late eighties, nurses were brought onto active duty during the critical nursing shortage as TNWO's with a designator of 7565, and were not NC officers. At the time, this was not intended to be an official accession source for the NC community. It was used solely to bridge the transition gap created by the accession policy change from direct procurement to the longer pipeline baccalaureate entry level training programs. TNWO's had an Associate's Degree in Nursing and were licensed as registered professional nurses.

This could be a valuable source of experienced staff nurses for larger health care facilities, and an ideal pool for the NC using a Duty Under Instruction (DUINS) upward mobility program for outstanding performers to attain their baccalaureate degree in nursing.

These individuals would have both the desired nursing and military backgrounds. As Warrant Officers, they would be more cost-effective for the Navy during their initial assignment and the DUINS period. Upon

commissioning, they could be granted entry grade credit for experience.

c. Naval Academy Master's Degree Bridge Program

A program for Naval Academy graduates to attend a BSN/MSN Bridge Program, like the Air Force at Vanderbilt University, could be highly beneficial. The NC would receive a highly committed Naval Officer who would also be entering at an advanced nursing educational level. These officers could be definite candidates for accelerated promotion into the highest ranks of Navy Medicine.

d. Uniformed Services University of the Health Sciences(USUHS) Triservice Nursing Program

Although a potentially costly training source, the expense of this program could be shared by all three military Medical Departments. A large active duty obligation could be incurred in exchange for educational and subsidy benefits.

e. Educational Loan Reimbursement/ Repayment/Cancellation

The active and reserve Medical Corps uses a reimbursement of medical training expenses program as an accession incentive. This program targets individuals who

have already completed schooling and are immediately available for service.(Cooke) A program similar to this could easily be set up for the NC.

A program which mirrors the current executive branch's initiative of government service for educational loan cancellation could also be formulated. This program would cost the Navy very little, yet provide valuable manpower resources.

f. Retention of Failure of Selection(FOS) Officers in Staff Positions

The Defense Officer Program Manpower Authorization (DOPMA) promotes an "up or out" policy to maintain "vigor" in the officer corps, but this policy may not be helpful for the staff corps and thus could be reconsidered.(NAVMED P-5128) Lieutenants who fail to select twice for LCDR are automatically separated without opportunity for continuation. Lieutenant Commander's who are twice FOS with less than fourteen years of service are also automatically separated. LCDR's between 14 and 19 years of service are reviewed yearly by a NC Continuation Board and are retained through to a twenty year retirement at the NC's discretion.

These individuals may not be field grade quality, however, they may be exceptional company grade officers. A level that is continually sought after is the senior staff

nurse; this position could be filled with these individuals. A main motivator for them could be the fitness report recommendation for retention. This could help to alleviate the "retired on active duty" syndrome.

2. Future Study Possibilities

First, other NC cohorts or NC aggregate behavior could be analyzed. Next, other areas involving NC Officer performance and commissioning program cost-effectiveness should be evaluated before decisions are made concerning future accession programs. Finally, models predicting the probability of successfully promoting to LCDR and Commander, or screening for Commanding Officer or Executive Officer (CO/XO) could be analyzed. This thesis does make several recommendations, however, further research would be helpful in determining a definite plan for the future.

a. Performance Index

Various explanatory variables were used in these models to isolate the effect of accession source on the success measures. There may be other factors that affect a NC Officers behavior which have been omitted from the models. For example, a performance index such as the score from the new fitness reports could have been introduced. Also, first duty station and first job assignment may affect

whether an individual completes initial obligated service and subsequently retains beyond initial obligated service. These variables were not included in this study because fitness report data was unavailable in the time required to complete this research. Other variables which could be added to the models are GPA, school quality, and military course attendance.

b. Marginal Costs

Each NC Officer accession source should have marginal costs calculated before any program is radically modified or cut. Average costs are commonly used in most government studies because they are easier to obtain. However, they only reflect the savings or additional costs for a large change in the number of officers completing a given program. Marginal costs show the affect of changing accessions by one individual in a particular gain source, a much more accurate figure for the numbers of individuals that are accessed for the NC.(Foster)

Determining the optimal mix of the highest quality Naval Officers, that provides the most cost-efficient accessions for the Navy, should be the goal of future research.

c. CO/XO Screening Analysis

This analysis would assist in understanding the possible factors that influence a NC Officer's ability to serve in executive medicine positions.(Farr)

In summary, this study attempted to model three measures of success: completion of initial obligated service, retention beyond initial obligated service, and promotion to lieutenant commander. Further development of a better fitting model may contribute towards better analysis of the effects of accession source as a predictor of success of Navy Nurse Corps Officers. In particular, incorporating fitness report or performance data, past school performance, or professional training data, could significantly improve the logit results. Lastly, further research should be conducted on more recent cohorts, using the more inclusive model, to assist the Navy in the development and use of future accession programs.

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